"On a review of these observations, the following conclusions, in regard to the urine passed during recovery from cholera, may, I think, be deduced:—

"1st. That the urine, besides being affected as to quantity, is materially altered in quality.

"2d. That this alteration consists in the presence of a very small quantity, or in the entire absence of urea, and in the presence of albumen and biliary colouring matter.

"3d. That, on examination by the microscope, there will be found uniformly associated and existing in amount commensurate with the albumen, epithelium assuming different forms, and derived from different parts of the urinary system.

"4th. That one or other of the following deposits will probably be present—amorphous urate of ammonia, uric acid, ammoniaco-magnesian phosphate, or oxalate of lime—the two latter being less frequently present than either of the former.

"5th. That the healthy condition of the urine, in so far as the increase in the amount of urea, and the disappearance of the albumen and bile, are concerned, is generally restored in the course of a day or two, if the case go on favourably.

"6th. That, as the association of albumen and bile, in particular, as well as the other general characters of the urine which have been stated to exist, is by no means of common occurrence, it follows that the careful examination of the urine in cholera is of importance both in diagnosis* and practice.†

"To which I feel disposed to add another conclusion, though it is not brought fully out in the preceding observations.

"7th. That the characters which have been stated to be those of cholera urine, will be always best marked in the severest cases."

58. *On the Non-existence of Bile in the Stools of Cholera, and in the first Urine secreted after the Algide Stage.*—Prof. Parkes formerly doubted whether the peculiar violet, pinkish, or purplish colour which is frequently produced in the rice-water stools of cholera, by the action of a small quantity of nitric acid, and in a less degree by hydrochloric acid, when aided by heat, was to be attributed to bile; but additional inquiries have led him to believe that the substance giving this reaction is "modified bile," as stated by Simon. "In a perfectly healthy stool," Prof. P. states that he has "lately obtained this violet reaction instead of the ordinary evidence of bile. I have found a similar tint almost invariably in the liquid stools of typhoid fever, and occasionally in those of typhus fever. And, as I have at present been able to find no evidence that normal or morbid pancreatic fluid, or any exudation from the intestinal mucous membrane, can give this reaction, I infer that it is attributable to bile. I have not been able to discover the cause of this peculiar, though, as it has occurred in a perfectly healthy stool, not abnormal, condition of the bile. It is not owing, as might be supposed, to excessive dilution, which might permit the bile-pigment to be acted on so rapidly by the nitric acid, that the green tint would be only momentarily seen, and would pass at once into one of the colours which in healthy bile succeed to it, and which might be conceived to be more stable. For, if the bile of cholera, as of any other disease, be diluted to the utmost extent, so that only the slightest tint is given by nitric acid, still that tint is invariably green; and if the solution is as dilute as it can be to give any colour at all with nitric acid, an excess of acid destroys the green colour without any transition tints. Possibly, as Simon supposed, the bile-pigment may become oxidized, or otherwise altered by the fluids with which it is mixed, or some normal constituent of the bile may be present in unusual quantity, while the

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* I have made frequent examinations of the urine in diarrhœa, and in the so-called choleroid diarrhœa, but have never found albumen and bile associated with epithelium, and a small amount of urea, to be the characters of such urine.

† Dr. Robertson prescribed colchicum in a case where a small quantity of urine, deficient in urea, was voided, and with the desired effect upon the urine, and with great benefit to the patient.

common bile-pigment may be at the same time deficient. Whatever be the nature of this substance, it gives no reaction with sugar and sulphuric acid.

"But, although this violet and pink tint can be obtained from many cholera stools in the earlier stage and in the milder cases, it cannot generally be procured from the fluid passed during the greatest height of the intense disease. So that at this period there is probably complete retention of bile; at any rate, there is no evidence whatever, that I can discover, of any passage of bile into the canal.

"In the first urine passed after the cold stage, there is generally a large quantity of a substance which gives the same characteristic colour with nitric acid. Whatever may be in other respects the condition of the urine, or of the fluid which represents it, more or less of this modified bile is present, and can be readily detected by nitric acid, either at once or by forming an alcoholic solution of the extract. Thus I have found it in a fluid, drawn from the bladder after the cold stage, in a case in which there was no further secretion. This fluid, about ℥i in quantity, was almost like coffee grounds, from the presence of a great number of blood-particles; it contained, of course, albumen, but no urea, and gave, with nitric acid, a deep violet colour, passing into a blackish purple. In other cases in which the urine has been transparent, yellow acid, without urea, or with mere traces, and containing albumen, the substance has been present in variable quantities. In one case, I found it in urine which contained not a trace of albumen, but so much of this modified bile that the colour given by nitric acid appeared almost black by reflected light; there was also some urea, but the quantity was not determined. In another case, I found a large quantity of albumen, with a mere trace of this substance; so that the manifestation of this substance did not seem connected with the appearance either of blood-particles, albumen, or urea. It seemed to pass off much more rapidly than the urea, and speedily disappeared when the urinary secretion was re-established, although the urea did not, for some little time, reach its normal standard. In the urine, as in the cholera stools, this substance seemed to be nearly destitute of colour till nitric acid was added. If there was any sediment in the urine, either of exudation or pus-corpuscles, phosphates, epithelium, casts of tubes—or, at a later date, of uric acid, urate of ammonia, or of soda—this substance gave them no colour. Its alcoholic solution rapidly decomposed, so that, in three weeks or a month, the characteristic reaction was almost or entirely lost.

"I believe this substance to be the same with that present in the cholera stools, for the following reasons:—

"1. In both cases, the substance is soluble in alcohol.

"2. In both. a most peculiar violet or pink tint is given by nitric acid to the alcoholic solution.

"3. In both, an excess of acid destroys the tint, and produces a light yellow colour. In the cholera stools, sometimes a shade of blue can be obtained after the violet; and in the urine sometimes a shade of green precedes the violet or puce colour.

"4. In both cases, if albumen be present, and be coagulated by heat and nitric acid, it is tinged of a red or violet colour, unless too much acid be added.

"I have not yet succeeded in satisfactorily detecting this substance in the blood. It is possible that it will shortly be found there.

"This substance is by no means peculiar to the urine of cholera. I have found it in the urine of various diseases. In Bright's disease occasionally, as noticed by Heller; in some obscure abdominal affections without albuminuria; in a case of abscess of the liver; in one of cholecystitis; in two cases of dysentery (although in the greater number of cases of dysentery it is not present); and in a complicated case of purpura, rheumatism, and Bright's disease. In these cases, the urine was generally clear, pale, acid, or neutral, and quite different from very dilute common icteric urine, which gives the ordinary reaction of bile-pigment.

"I believe, for reasons which will be more fully considered at another time, that this substance has been described by Heller as a normal urinary colouring matter, under the name of uroxanthin. Uroxanthin, with nitric acid, gives the pink tint, and passes first into urrhodin, and subsequently it passes into the blue uroglaucin. I believe these changes may sometimes be followed in cholera stools, with which not a particle of urine has been mixed. So, also, I believe, that this modified bile has been included by Dr. Golding Bird in his description of purpurine, although it does not altogether correspond to this substance. But it would be foreign to the object of this note to pursue the subject further at this time."—*Monthly Journ. of Med. Sciences,* Oct. 1849.

59. *Abstract of Observations made in the Cholera Hospital at Leyden, during November and December,* 1848, *and January,* 1849. By Dr. F. J. J. Schmidt.—From the 7th of November, 1848, to the 3d of January, 1849, 146 patients were received into the hospital—82 males, and 64 females. Forty-nine of the patients were under fifteen years of age. The youngest admitted was two years and a-half old, the oldest seventy-two. With the exception of ten persons, who were suffering merely from ordinary diarrhœa, all were affected with genuine Asiatic cholera. The greatest number were admitted towards the end of November, and the first half of December. All were of the lowest class; workmen, labourers, beggars, &c.; and all, except three, inhabitants of Leyden. It could not be ascertained that any of them had been attacked during the epidemic of 1832.

Many of those who were not carried off by the cholera were attacked with consecutive diseases—by far the most frequent of these being typhus.

Few of the patients could give any clear account of premonitory symptoms; and very many described their health to have been perfectly good just previous to the attack. Excesses of various kinds could not be traced as the exciting cause, nor was it observed that more patients were admitted after Sundays and festivals. Exposure to unusually wet weather seemed to have more influence. An instance of this was furnished by a beggar, who went out on a very rainy morning in good health, wandered about all day, and was brought dripping wet to the hospital, at nine in the evening, in the worst state of collapse; he died early the following morning.

None of the numerous hospital attendants were attacked with the disease.

There was much variety in respect of the duration of the illness. The shortest periods were eight and nine hours; both fatal cases. The occurrence of hiccup during the attack was usually a fatal sign; a fact in direct opposition to the statements of several German writers.

In two women, who were suckling at the time of their being attacked, the mammæ became completely collapsed during the acute stage. With the first signs of reaction they began to swell, soon became turgid with milk, and, when reaction had fully set in, were so distended and painful, that it was necessary to draw off the milk several times. In both patients, this was done twice before the secretion of urine had been re-established, and in one of them before the feces had begun to be coloured with bile. The milk was very thin, of a light green tint, and became of a more decidedly green colour in the course of a few days. Chemical analysis demonstrated the presence of uric acid in it before the secretions of urine had set in. The colouring matter of bile could not be detected by the ordinary tests, so that the cause of the greenness was not ascertained. In the last-named patient, the milk first secreted was found to be composed as follows:—

1000 parts contained—

Water,	917.007	
Solid matter,	82.993	
Casein,	8.714	
Butter,	2.919	
Sugar of milk, Extractive matter, Salts,	71.223	
Urea,	0.127	
		82.993

The milk, when fresh, was neither acid nor alkaline; its specific gravity was 1028.3, healthy milk having a specific gravity of 1028 to 1042.